

**WAVEGUIDE INCLUDING AT LEAST ONE PHOTONIC CRYSTAL
REGION FOR DIRECTING SIGNALS PROPAGATING
THERE THROUGH**

5

ABSTRACT OF THE DISCLOSURE

A waveguide assembly is provided that includes a waveguide region and at least one photonic crystal (PhC) region. The waveguide region includes a longitudinally extending core that has an input channel and at least one output channel, and a cladding at least partially surrounding the core for confining signals within the core. The PhC region(s), in turn, extend laterally through at least a portion of the core to at least partially direct signals propagating through the core. The PhC region(s) can extend through at least a portion of the core to thereby form, for example, a bend, beamsplitter, polarizing beamsplitter, Mach-Zender interferometer or ring resonator for signals propagating through the core.

15